REMARKS

By this Response, claims 1, 10, 11, and 20 have been amended. Claim 26 has been added. Claims 20-24 are previously withdrawn. No claims have been canceled. Claims 1-26 are pending.

Rejection of Claims 1, 3-4, 5 and 8-10 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 1, 3-4, 5 and 8-10 under 35 U.S.C. § 103(a) as being unpatentable over *Chien et al.* (U.S. Patent Publication No. 2002/0142610) in view of *Kim et al.* (U.S. Patent No. 6,500,763). This rejection is respectfully traversed.

The subject matter of independent claim 1 is directed to a method for etching a substrate. The method includes providing a substrate having an aluminum oxide etch stop layer located thereunder; providing a microelectronic device, the aluminum oxide etch stop layer positioned between the microelectronic device and substrate; and etching an opening in said substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of said carbon oxide is greater than about 80 sccm and said etchant is selective to said aluminum oxide etch stop layer, and without overetching said etch stop layer into said microelectronic device and without introducing hydrogen into the process.

It is the Examiner's position that *Chien et al.* disclose a method for manufacturing a semiconductor device which involves plasma etching of the dielectric layer as claimed, referencing specific portions thereof. The Examiner acknowledges, however,

that *Chien et al.* fail to expressly disclose using an aluminum oxide etch stop layer and has provided *Kim et al.* for this teaching, referring to column 4, lines 60-65 thereof.

To the contrary, it is respectfully submitted that *Chein et al.* specifically require silicon nitride and other close silicon compounds as a stop layer for oxide etch applications. Further, the disclosure of *Chein et al.* fails to appreciate that the silicon nitride will introduce unwanted hydrogen into the device.

Although the Examiner applies *Kim et al.* as disclosing an aluminum oxide etch stop layer, it is respectfully submitted that aluminum oxide is as an "auxiliary" etch stop layer and in addition to the tantalum etch stop layer. Accordingly, it is respectfully submitted that the aluminum oxide layer of *Kim et al.* is simply an additional barrier layer. As set forth in dependent claim 26, the present invention is without the additional barrier layer. In addition, the aluminum oxide of *Kim et al.* is not formed between the substrate and microelectronic device as claimed.

Finally, it is respectfully submitted that one of ordinary skill in the art would not look to use an aluminum oxide in *Chien et al.* since the disclosure is specific to the use of silicon nitride and other silicon compounds, and there is no applied reference in which an aluminum oxide is positioned as claimed without overetching said etch stop layer into said microelectronic device and without introducing hydrogen into the process. Thus, there is no motivation to make the combination as offered.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 1, 3-4, 5, and 8-10 under 35 U.S.C. § 103(a). Applicants respectfully submit that claims 3-4, 5 and 8-10 are in condition for allowance, at least by virtue of their dependency from allowable claim 1.

Rejection of Claims 2, 6, 12, and 16 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 2, 6, 12, and 16 under 35 U.S.C. § 103(a) as being unpatentable over *Chien et al.* (U.S. Patent Publication No. 2002/0142610) in view of *Kim et al.* (U.S. Patent No. 6,500,763) and further in view of *Demmin et al.* (U.S. Patent No. 6,635,185). This rejection is respectfully traversed.

The subject matter of dependent claims 2, 6, 12 and 16 are directed to gas flow rates.

It is the Examiner's position that *Chien et al.* as modified by *Kim et al.* fail to disclose the specific claimed flow rate of carbon oxide, fluorocarbon and oxygen, although *Chien et al.* disclose the ranges of the flow rate that encompass the specific claimed flow rate (referring to age 2, paragraph 0014 thereof). Accordingly, *Demmin et al.* are applied for the disclosure in column 7, beginning at line 15 thereof.

To the contrary, it is respectfully submitted that *Demmin et al.* fail to remedy the deficiencies pointed out above in connection with the primary reference combination.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 2, 6; and 12, 16 under 35 U.S.C. § 103(a). Applicants respectfully submit that these claims are further in condition for allowance, at least by virtue of their dependency from allowable claims 1 and 11, respectively.

Rejection of Claims 7 and 17 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 7 and 17 under 35 U.S.C. § 103(a) as being unpatentable over *Chien et al.* (U.S. Patent Publication No.

2002/0142610) in view of *Kim et al.* (U.S. Patent No. 6,500,763) and further in view of *Fitch et al.* (U.S. Patent No. 5,324,683). This rejection is respectfully traversed.

The subject matter of dependent claims 7 and 17 are directed to the etch rate modulator comprising nitrogen.

The Examiner acknowledges that the combination of *Chien et al.* in view of *Kim et al.* fail to disclose using nitrogen in the etchant. Accordingly, *Fitch et al.* has been applied for this teaching.

To the contrary, it is respectfully submitted that *Fitch et al.* fail to overcome the deficiencies identified above in connection with the primary rejection combination.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 7 and 17 under 35 U.S.C. § 103(a). Applicants respectfully submit that claims 7 and 17 are further in condition for allowance, at least by virtue of their dependency from allowable claims 1 and 11, respectively.

Rejection of Claims 11, 13-14, 18-19, 21 and 21 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 11, 13-14, 18-19, 20 and 21 under 35 U.S.C. § 103(a) as being unpatentable over *Chien et al.* (U.S. Patent Publication No. 2002/0142610) in view of *Kim et al.* (U.S. Patent No. 6,500,763). This rejection is respectfully traversed.

The subject matter of independent claims 11 and 20 are directed to a method for manufacturing an integrated circuit and an integrated circuit manufactured by the method, respectively. The method comprises providing semiconductor devices over a semiconductor substrate; providing a dielectric layer over said semiconductor devices,

said dielectric layer having an aluminum oxide etch stop layer located thereunder and without providing an additional barrier layer between the semiconductor device and dielectric layer; and etching openings in said dielectric layer using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of said carbon oxide is greater than about 80 sccm and said etchant is selective to said aluminum oxide etch stop layer; and contacting said semiconductor devices through said openings.

It is the Examiner's position that *Chien et al.* disclose a method for manufacturing a semiconductor device which involves plasma etching of the dielectric layer as claimed, referencing specific portions thereof. The Examiner acknowledges, however, that *Chien et al.* fail to expressly disclose using an etch stop layer of SiN and has provided Kim et al for this teaching, referring to column 4, lines 60-65 thereof.

To the contrary, it is respectfully submitted that *Chein et al.* specifically require silicon nitride and other close silicon compounds as a stop layer for oxide etch applications. Although the Examiner applies *Kim et al.* as disclosing an aluminum oxide etch stop layer, it is respectfully submitted that aluminum oxide is as an "auxiliary" etch stop layer and in addition to the tantalum etch stop layer. Accordingly, it is respectfully submitted that either the aluminum oxide or tantalum layers of *Kim et al.* can be considered an additional barrier layer. As claimed, the present invention is without the additional barrier layer. In addition, the aluminum oxide of *Kim et al.* is not formed between the substrate and microelectronic device as claimed.

Finally, it is respectfully submitted that one of ordinary skill in the art would not look to use an aluminum oxide in *Chien et al.* since the disclosure is specific to the use

of silicon nitride and other silicon compounds, and there is no applied reference in which an aluminum oxide is positioned as claimed without providing an additional barrier layer. Thus, there is no motivation found in the reference combination to teach or suggest the claimed invention.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 11, 13-14, 18-19, 20 and 21 under 35 U.S.C. § 103(a). Applicant respectfully submits that claims 13-14, 18-19; and 21 are in condition for allowance, at least by virtue of their dependency from allowable claims 1 and 20, respectively.

CONCLUSION

In view of the foregoing remarks, Applicants submit that this claimed invention is neither anticipated nor rendered obvious in view of the prior art references applied against this application. Applicants therefore request the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 20-0668.

Respectfully submitted,

Dated: December 18, 2007

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